

## Current, I

rate of flow of electric charge, q

$$I = q/t$$

units: Ampère,  $A = C/s$   $C = As$

- special note - A is an SI base unit while the coulomb is a derived unit - historically it was easier to measure A

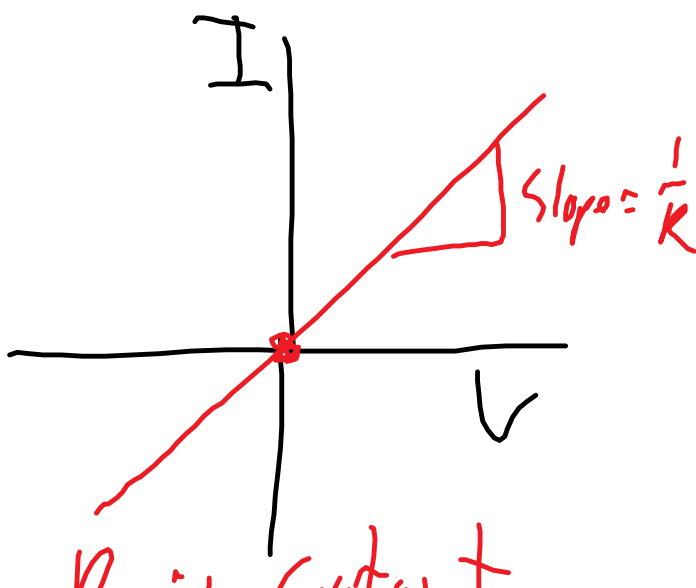
## Resistance and Resistors

Resistance is defined as the ratio of the voltage to the current through a circuit element.

$$R = V/I$$

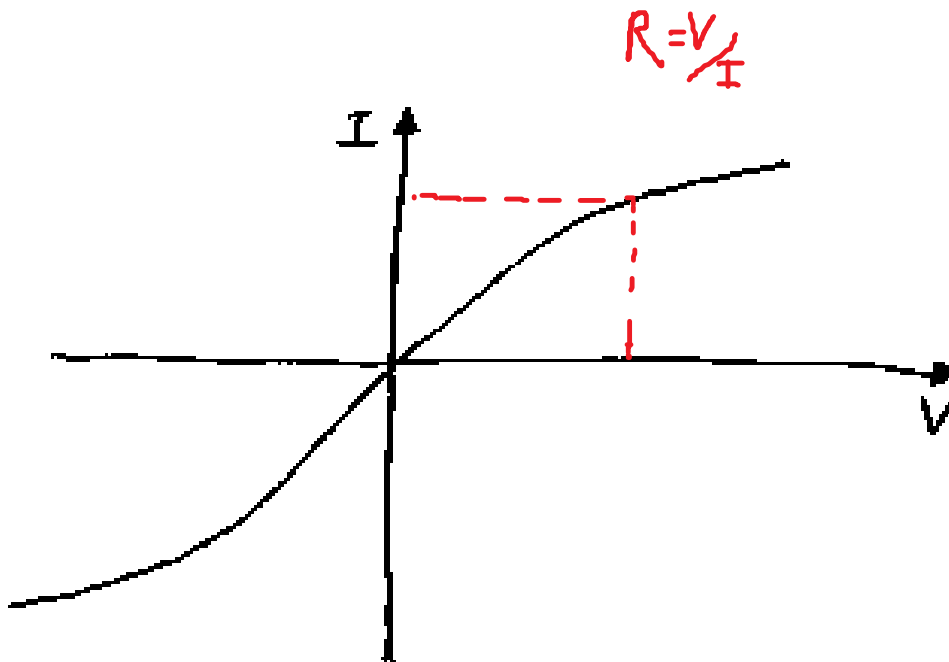
- not the slope of a non-linear V-I graph! ratio at a specific point

Ohmic	(resistor)
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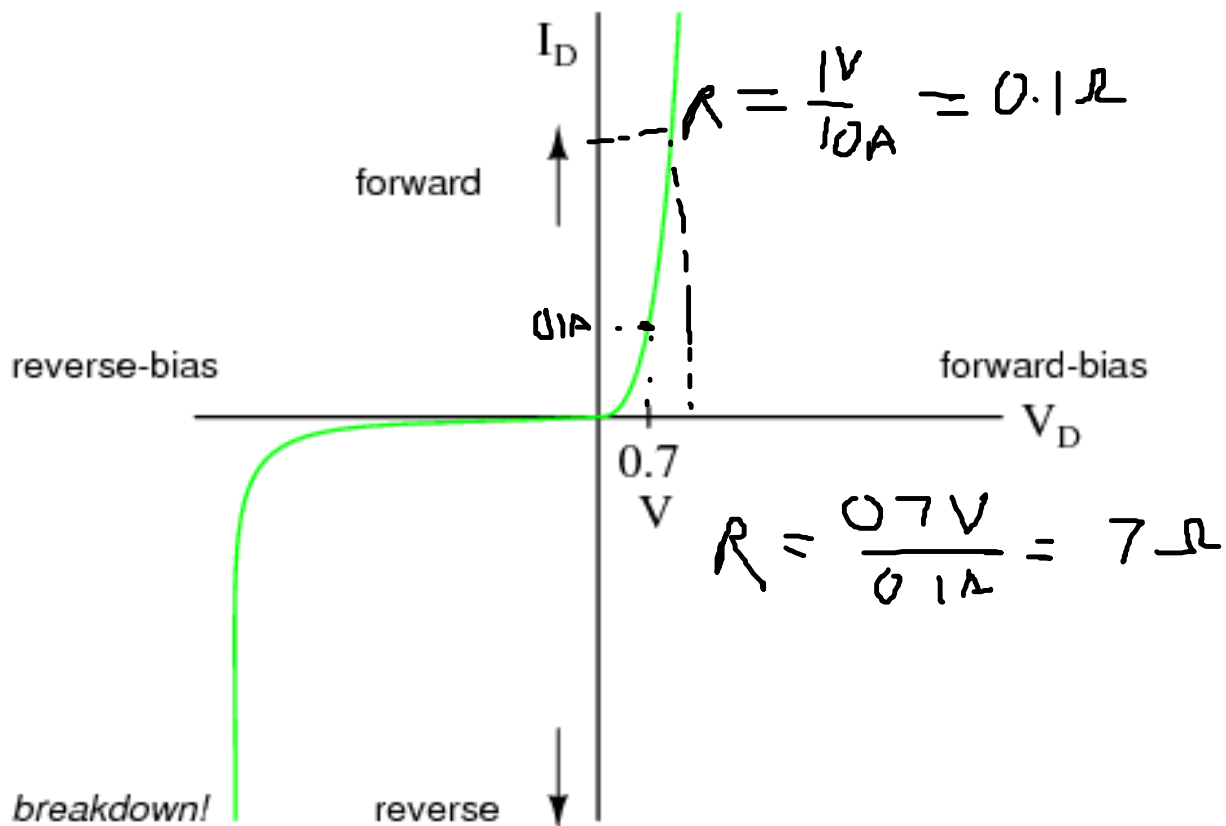


$\tilde{R}$  is constant

filament lamp



as the filament gets hotter or colder, it dissipates more energy for a set current  
diode



very non-ohmic

use resistors to protect other devices from being fried by too much current.

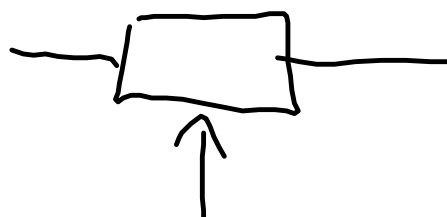
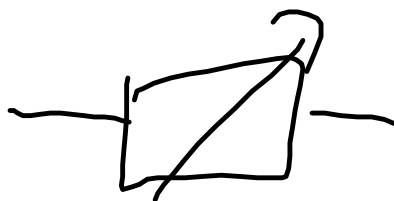
Resistor



IB



textbook



} Variable resistors  
Rheostats  
Potentiometers

Resistors dissipate electrical energy as heat to protect other circuit elements and/or control the current

eg. A light bulb is connected to a 6.0V battery.  
if a current of 450mA goes through the bulb,  
what is

- a) resistance of the filament,
- b) the amount of charge going through in 5.0s
- c) the energy given off as heat  
( $V = \text{energy} / \text{charge}$ )
- d) power dissipated by the resistor
- e) derive equations for the power dissipated by the circuit element